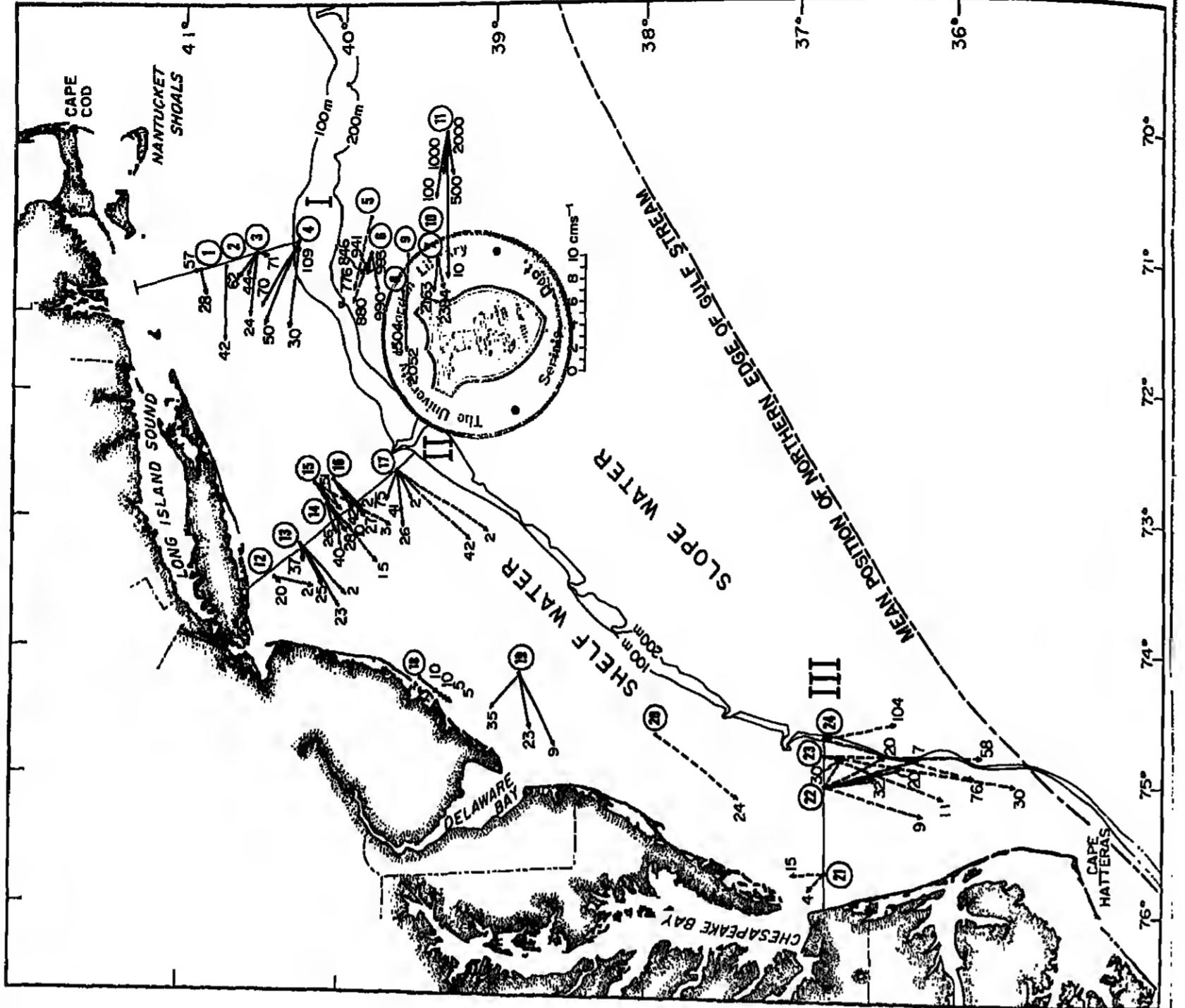


EOS

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EOS, TRANSACTIONS, AMERICAN GEOPHYSICAL UNION

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FEBRUARY 3, 1981

GEOPHYSICIST

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International Ocean Technology Conference

A call for papers has been issued for Oceans '81, an international ocean technology conference, scheduled for September 16-18 in Boston, Massachusetts. Abstracts, due March 1, should be no longer than 400 words and should be submitted in four sections: title and author's name and results and conclusions. Abstracts must be in English and should accompany a brief biographical sketch of the author(s). Papers may be presented in a lecture or in a poster session.

Authors of papers selected for presentation will be notified by mail by April 1. Camera-ready papers are due June 1. Abstracts and biographical sketches should be sent to Oceans '81, Technical Program Committee, P.O. Box 132, Providence, Rhode Island 02877. Additional information can be obtained from the above address or by calling James Barron, Committee Chairman, at (617) 481-1850.

The conference is sponsored by AGU, the IEEE Council of Oceanic Engineers, the Boston section of IEEE, the Marine Technology Society (MTS), the New England section of MTS, and the Southern New England section of MTS. \$8

Migration to the Shore

The Center for Coastal Studies at the Scripps Institution of Oceanography will sponsor an international symposium entitled "Quaternary Land-Sea Migration Bridges and Human Occupation of Submerged Continents" on October 26-31. Marine archaeology and the migration of early man in the coastal regions of the world is one subject area being studied at the new center.

For additional information about the center or about the symposium, telephone Douglas L. Jemmen, center director, 714-452-4234, or Paulina M. Masters, coordinator of the marine archaeology program, 714-452-2985. \$8

European Union of Geosciences

The first meeting of the European Union of Geosciences is scheduled for April 13-16 in Strasbourg, France. In addition to the regular sessions, several symposia will be held. Symposia topics include basin evolution from heat flow to oil, episodic versus continuous geodynamics processes; continental development and structure; early development of the earth; European seismicity and earthquake prediction; paleoclimates; ophiolites and greenstone belts; and magma generation and segregation.

Travel grants will be awarded for submission of high-quality abstracts.

For information on registration, abstract submission, housing, and awards, write to European Union of Geosciences, Organizing Committee, Institut de Physique du Globe de Paris, Université Paris VI, 4 Place Jussieu, 75230 Paris, France. D.C. 20009. Deadline: March 31, 1981.

Cover: An Apollo view of the moon's 11-km-diameter crater, Goddard A, and associated swirl patterns. The swirl patterns are unlike typical crater rays, which become brighter at larger phase angles. One proposal by P. H. Schultz and L. J. Brink suggests that they represent imprints of the fine-scale structure of the inner core of a comet (*Nature*, 244, 1980). The collision of these swirl patterns reflects locally heated, scoured, and altered the upper regolith, thereby producing the unusual photometric properties. The correlation of such swirl patterns with strong magnetic anomalies might be explained by the compression of magnetic field lines that takes place within the comet during collision, and which is recorded by altered regolith materials. (Photo courtesy of P. H. Schultz, Lunar and Planetary Laboratory, Houston, Texas.)

EOS

TRANSACTIONS, AMERICAN GEOPHYSICAL UNION

The Weekly Newspaper of Geophysics

EOS invites contribution of reviews, short articles, meeting reports, news notes on recent research, and letters to the editor. Material must be readable, contain little or no mathematics, be of broad interest to scientists in the various disciplines of the Union, and be timely.

EOS also welcomes contributions dealing with the interface of geophysics with society. This newspaper is an effective way to address those involved in the study of the earth and its environment in space.

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Views expressed in this publication are those of the authors only and do not reflect official positions of the American Geophysical Union unless expressly stated.

AGU Congressional Science Fellowship

The individual selected will spend a year on the staff of a congressional committee or a House or Senate member, advising on a wide range of scientific issues as they pertain to public policy questions.

Prospective applicants should have a broad background in science, be articulate, literate, flexible, and able to work well with people from diverse professional backgrounds. Prior experience in public policy is not necessary, although such experience and/or a demonstrable interest in applying science to the solution of public problems is desirable.

The fellowship carries with it a stipend of up to \$25,000 plus travel allowances.

Interested candidates should submit a letter of intent, a curriculum vitae, and three letters of recommendation to AGU. For further details, write Member Programs Division, Congressional Fellowship Program, American Geophysical Union, 2000 Florida Avenue, N.W., Washington, D.C. 20009.

Deadline: March 31, 1981.

Cover: An Apollo view of the moon's 11-km-diameter crater, Goddard A, and associated swirl patterns. The swirl patterns are unlike typical crater rays, which become brighter at larger phase angles. One proposal by P. H. Schultz and L. J. Brink suggests that they represent imprints of the fine-scale structure of the inner core of a comet (*Nature*, 244, 1980). The collision of these swirl patterns reflects locally heated, scoured, and altered the upper regolith, thereby producing the unusual photometric properties. The correlation of such swirl patterns with strong magnetic anomalies might be explained by the compression of magnetic field lines that takes place within the comet during collision, and which is recorded by altered regolith materials. (Photo courtesy of P. H. Schultz, Lunar and Planetary Laboratory, Houston, Texas.)

Editorial

AGU Annual Meetings

The purpose of this editorial is to inform AGU members about the procedure for scheduling the annual meetings, to explain the role of the section program chairmen, and to emphasize the importance of timely submission of abstracts.

The dates and locations for the annual meetings are set by the AGU Council, based on recommendations from the Meetings Committee. In making these recommendations the Meetings Committee considers the suggestions of AGU members and reviews possible sites on the basis of facilities, costs, convenience to transportation, probable weather conditions, number of local AGU members, and general attractiveness of the host city. The choice of meeting dates as well as the location is heavily influenced by hotel costs since the rates which can be negotiated with the hotels depend on the expected demand for hotel rooms. Thus, this year, the Spring Meeting is scheduled for the week that includes Memorial Day, when business travel and hotel demand is reduced. In the past it has sometimes been necessary to schedule the meeting to straddle a weekend in order to obtain lower hotel rates. The inconvenience of meeting on weekends and holidays is recognized, but it is felt that the cost savings achieved in this way are essential. The point to be emphasized is that the selections are not made lightly, and the Meeting Committee, the AGU staff, and the AGU Council make a thorough evaluation of potential sites and dates before making a decision.

Once the dates for an AGU meeting have been decided, the overall scheduling, which includes setting the date for the call for papers, the abstract deadline, the program chairman's meeting, and the mailing of the program in *EOS*, is derived by considering the time required for completing these various steps. Recognizing the desirability of having up-to-date abstracts, the abstract deadline is set as late as possible. However, this tactic necessarily limits the time available for all subsequent steps in strengthing the program.

These factors conspire to place a heavy burden on the section program chairmen in planning the programs. These chairmen are responsible for organizing special sessions, grouping the contributed abstracts into coherent sessions, selecting session chairmen, and scheduling the time and room assignment of each session. A section program chairman has approximately 2 weeks between his receipt of on-time abstracts and the program chairman's meeting. At the program chairman's meeting, which typically takes 2 days, the entire program is completed, meeting rooms are assigned, and efforts are made to minimize conflicts between

various sessions. At this time, abstracts that may have been misdirected are transferred to the proper section program chairmen. Throughout the 2-week period between abstract deadline and the chairman's meeting, the continuous arrival of late abstracts can disrupt the work of these chairmen. In some cases a chairman has arrived at the program meeting with his program completely organized but is confronted with an additional 20 to 30 late abstracts. These abstracts cover a multitude of subjects and cannot be grouped into a single session. Adding them to existing sessions will extend those sessions unduly. The net result is that the program chairman is forced to reorganize his entire program on short notice during a time when he is busy with the other affairs of the program meeting.

The problem of the late receipt of abstracts is serious one. In 1978, fully 60% of the abstracts arrived after the meeting deadline. To help alleviate the situation a \$25.00 penalty was assigned to abstracts that arrived late. At the 1980 Fall Meeting, only 17% of the abstracts were received late, but this figure is still inconveniently large. While it is recognized that the deteriorating U.S. Postal Service is partly responsible, assigning blame to a federal agency does not reduce the difficulty of processing late abstracts. I urge you to make every effort to mail abstracts early enough to ensure their timely arrival or send them by more expensive but reliable services such as Federal Express.

The AGU annual meetings have been growing steadily in both attendance and number of papers presented, and the meeting facilities available at most cities are now barely adequate. Furthermore, the large numbers of papers make simultaneous sessions necessary for most sections. To make the meetings more manageable and productive, there will in the future be increased emphasis on poster sessions and a rigid enforcement of the limit of one author-contributed paper per member. In addition, more topical conferences and symposia will probably be held to supplement the annual meetings.

The vitality of the annual meetings is a major factor in the health of geophysical research. The Meetings Committee, the program chairmen, and the AGU staff are receptive to suggestions from the membership that can lead to more effective meetings. With the growth in attendance and in contributed papers it will be necessary for the meeting structure to evolve, and your help in suggesting changes will be appreciated.

Martin Wall
Meetings Chairman

News

Fiscal 1982 Budget Highlights R&D

Geophysical research and development programs show growth beyond inflation in the \$739.3 billion budget for fiscal 1982 that Jimmy Carter sent to Congress 5 days before completing his term. Included in the budget are provisions for increased support for the Ocean Margin Drilling Program and funds for an Interagency Geological Applications Program, funds for an agriculture and resource survey program that relies on remote sensing, and funds for the Venus Orbiting Imaging Radar mission.

Ronald Reagan is expected to make changes in the budget as early as late February, although in mid-January the heads of the scientific agencies could not characterize possible changes. Some Washingtonians say sharp cuts are inevitable, with basic research a prime candidate. Others, however, contend that the Reagan administration's push for productivity and innovation could prevent severe curtailments.

EOS will track the FY 1982 budget changes through congressional approval.

R&D Shows Real Growth

Obligations, or commitments of monies (not actual outlays) for conduct of all federally funded R&D total \$41.7 billion for fiscal 1982, an increase of \$6.8 billion or about 16.5% over 1981 obligations (Table 1). With the inflation rate at about 10%, the proposed budget shows real growth for R&D of about 8.5%. Within the R&D budget, obligations for basic research show a 14.4% increase (Table 2). Biggest increase for basic research among the agencies fell to NASA. Funds for conduct of R&D at universities and colleges barely scraped above inflation, with an 11.3% increase (Table 3).

The National Aeronautics and Space Administration (NASA) total budget fared well with an increase of 21% over 1981. Among federal agencies, this increase—to a \$6.7 billion purse—is second only to that for the Defense Department's proposed total budget.

NASA R&D obligations show a 21.5% increase over those of 1981. Over \$2.2 billion, or about half of NASA's R&D request, is slated for the space shuttle. The shuttle is the centerpiece of NASA's civil and military space efforts throughout the 1980s, according to Robert Frosch, former NASA Administrator. The first orbital flight test is scheduled for March, with three more test launches in 1981 and 1982. The first operational flight will follow in late 1982.

Another highlight of the NASA budget is \$40 million for the initiation of the Venus Orbiting Imaging Radar (VOIR) mission (*EOS*, December 2, p. 1202). One VOIR spectrometer, scheduled to be launched from the shuttle in 1988, will

probe Venus' dense cloud cover to discover more about the planet's geophysics and atmosphere.

Request for development of the Gamma Ray Observatory (GRO) nearly triples over 1981's \$17.6 million. GRO will be launched in 1986 to study objects in the universe in the gamma ray spectral region. Fabrication work will also continue on the International Solar Polar mission; the 1982 budget request of \$58 million is a 46% increase over the previous year.

TABLE 1. Federal R&D Obligations by Agency (Millions of Dollars)

Agency	FY 1980	FY 1981 est.	FY 1982 est.	Change 1981-82
DOD-Military	13,943	16,226	20,033	+ 23.5%
NASA	5,084	5,422	6,589	+ 21.5%
DOE	4,737	5,187	5,842	+ 9.2
HHS	3,780	3,984	4,285	+ 8.1
NSF	888	1,015	1,157	+ 14.1
USDA	887	776	871	+ 12.3
Interior	438	485		

(News cont. from page 49)

TABLE 3. Federal R&D Obligations to Universities and Colleges by Agency (Millions of Dollars)

Agency	FY 1980	FY 1981 est.	FY 1982 est.	Change 1981-82
HHS	2,076	2,185	2,354	+ 7.8%
NIH	11,897	12,011	12,150	+ 1.4%
NSF	668	781	888	+ 14.1
DOD-Military	451	528	639	+ 21.0
DOE	293	312	351	+ 12.9
USDA	221	241	283	+ 17.4
NASA	171	188	204	+ 8.5
All Other	312	326	353	+ 8.1
Total	4,190	4,541	5,053	+ 11.3

Source: Office of Management and Budget

Budget obligation for the Galileo mission to Jupiter swelled 71% to \$108 million. Fabrication work will continue in 1982 in preparation for separate launches, planned for 1985, of the mission's two major components. The hydrogen experiment budget was raised 88% to \$7.5 million.

Upper atmosphere research will be expanded in 1982 to study ground and space system studies and instrument design and testing for a future satellite mission to study the interactions among the chemistry, radiation, and dynamics of the upper atmosphere; \$20 million has been budgeted for these experiments.

NSF: \$75M To Improve Labs

The National Science Foundation (NSF) obligations for research and development in fiscal 1982 were boosted 14% to \$1.18 billion. The big winner is a new program to upgrade and modernize university research instrumentation; NSF allocated \$75 million to the program. Up to 120 awards, one per institution, will be made under the \$75 million program to upgrade instrumentation and facilities. This program aims to increase the productivity and efficiency of research groups. Another goal is to improve the return on investment of federal research support funds.

Cooperative industry/university research projects also gained a large boost in Carter's budget proposal. NSF has obligated \$26.8 million, nearly double the 1981 level.

NSF-sponsored basic research will get \$1.06 billion in 1982, 15% above 1981's funding level. Highest increases in basic research are allocated to the mathematical and physical sciences, to engineering, and to the social and economic sciences.

Funds to initiate construction of a 25-m, millimeter wave telescope on Mauna Kea, Hawaii, are included in the NSF purse. Complete design and initial fabrication, scheduled for fiscal 1982, will require \$9.8 million. Approximately the same level of funding is expected for the following two fiscal years; installation of the telescope is scheduled for 1984.

Obligations for ocean drilling programs grow by 38.4% over 1981's obligation of \$22 million; NSF has requested \$30 million. The Deep Sea Drilling Project (DSDP) and the International Phase of Ocean Drilling (IPOD) together get \$14 million, down \$3 million. The Ocean Margin Drilling Program (OMDP) is budgeted for an additional \$11 million over 1981, bringing NSF's share in the program to \$18 million. An identical amount will be obligated by U.S. petroleum companies. Planned for fiscal 1982 is the initial implementation phase, including detailed design, science planning, and long-lead-time procurement.

The Astronomical, Atmospheric, Earth, and Ocean Sciences Directorate shows real growth of 3.5%, with a budget obligation of \$268 million.

In terms of real growth, the U.S. Antarctic Program will shrink by about 2%; the overall 6% increase does not cover the calculated rate of inflation. NSF has requested \$70.1 million for the program. Cutbacks at Site Station (Eos, November 11, p. 906) were caused by increased fuel costs.

Support of applied research programs shows no real growth above inflation in fiscal 1982. Funding increased 10.8% to \$90.2 million.

NOAA Expands Acid Rain Research

The National Oceanic and Atmospheric Administration (NOAA) has been allocated \$1.05 billion of the federal budget, an increase of 23.7% over 1981. NOAA's total budget and atmospheric services is slated for 42.7%, or \$44.1 million, of NOAA's budget; the satellite programs share is 14.4%, research and development (\$12.5 million or 12.3%), and coastal zone management (\$46 million or 4.4%).

Support will be expanded for acid rain research and on improved methods of detecting, tracking, and forecasting weather systems and violent storms.

Much of NOAA's increase is reflected in the transition of LANOSAT to the environmental satellite services division. NOAA is now the lead agency for all civilian satellite operations. The 1982 budget request includes \$122.4 million for first-year costs of the interim LANOSAT system. Total budget increase for the environmental satellite service is 181% over 1981.

Specialized environmental services showed a 4.1% increase to \$46.8 million, but within it the air pollution and life weather services jumped 49% to \$5.7 million. This increase is the result of expanded research planned to investigate acid rain pollution. This research received an additional \$1.5 million over the 1981 funding level.

Other divisions of NOAA did not even keep up with inflation in the proposed budget. Basic environmental services increased 5.8% to \$166.4 million. Public forecast and warning services increased 7.4% to \$101.3 million, all reflected in one program. Public weather services increased \$7 million to \$59.6 million.

NOAA's budget provides for the continued operation of the two weather satellite systems and the development of an ocean satellite system. No funding is proposed, however, for coastal energy impact formula grants or for coastal environment grant and credit assistance in fiscal 1982.

One new responsibility NOAA takes on in fiscal 1982 is to license and regulate ocean thermal energy conversion (OTEC) and deep seabed mining.

USGS Budget Sliced by 9%

The fiscal 1982 budget request places the U.S. Geological Survey (USGS) funds by nearly 8%, to \$675.6 million. Research priorities within the survey include investigating the causes and effects of geologic and environmental hazards such as earthquakes, volcanoes, ground failure, acid rain, and toxic wastes.

Increases in the office of geologic and mineral resource surveys and mapping will provide for growth of the earthquake program. Development of a system to monitor continuous strain in southern California is included in this category. In addition the USGS will initiate two programs: one will coordinate a research program in landslide hazards warning and mitigation, and the other will research deep continental crust.

Under the water resources investigations office, the USGS will initiate a program to research the effects of acid rain. The NOAA and USGS programs in acid rain pollution are an attempt to understand and quantify the phenomena. The water resources office will also initiate a program on the prevention and mitigation of groundwater contamination. Despite these program initiatives, the office's budget doesn't beat inflation; funding increases only 5.8% to \$125.7 million.

The Water and Power Resources Service, another part of the Department of the Interior, shows an increase of 13.5% to \$913.5 million in fiscal 1982 obligations.

Budget Includes Interagency Programs

Three interagency programs budgeted for fiscal 1982 directly involve geophysics. A new program, the Geological Applications Program (GAP), with budget obligations totaling \$19 million for 1982, will coordinate research activities among the USGS and NASA. Measurement techniques based on remote sensing developed by NASA will be tested in mineral appraisal projects conducted by the survey. NASA and USGS geologists will jointly develop new models and analyze remote sensing and ground truth data to provide an overall evaluation of the utility of space techniques for mineral resource assessment. NASA will contribute \$10 million.

The second interagency program, dubbed AgRISTAR (Agriculture and Resource Inventory Surveys Through Aerospace Remote Sensing), is a continuing program designed to assess the value of space remote sensing data for early warning of crop conditions and for improving worldwide agricultural production forecasts. Participating in the program are the Agriculture, Commerce, and Interior departments; NASA; and the Agency for International Development. Obligations total \$54 million.

The third program, the National Oceanic Satellite System (NOSS), will continue as joint effort of NASA and the Department of Defense and Commerce. This satellite system will provide global ocean data for use in marine weather forecasting and climate studies, marine transportation, and defense applications. Obligations in fiscal 1982 are slated at \$95 million. —BTS

Data Systems Users Working Group

A Data Systems Users Working Group (DSUWG) has been formed, at the request of NASA's Office of Space Science (OSS) by members of the space science community concerned with improving the yield, significance, and pace of scientific output from the massive, and growing, data base generated by spacecraft observations. The first meeting of the DSUWG was convened at Marshall Space Flight Center (MSFC) on September 11 and 12, 1980, by cochairmen James L. Green (MSFC) and Eugene W. Greenstreet (TRW). Most of the attendees of the first meeting were investigators long occupied with handling large data sets or coordinating measurements of separate but related space plasma variables. This particularly included members of the Atmosphere Explorer (AE) team.

The meeting was organized around a series of talks that included descriptions of past and future data networks at both the institutional and national level. Representatives from MSFC described the data-based management system of the NEEDS (NASA End-to-End Data System) program, and representatives from Goddard Space Flight Center outlined the present state of standardization of computer network protocol. Discussion focused on the general state of past space science data bases, on the likely forms and problems of future data bases, and on the means of applying state-of-the-

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art manipulation techniques to expedite reduction and analysis of spacecraft data. Attention was directed particularly to the necessity of facilitating data communications and exchange between investigators and remote data sources via compatible computer networks comparable to those currently in routine use by banks, airplanes, and commodity traders.

The working group conferred on a statement of concern and a set of broad recommendations to be forwarded to NASA/VOSS in order to encourage early adoption by the agency of measures designed to modernize and strengthen the nation's efforts at turning the accumulated and planned observational records into meaningful scientific conclusions. The DSUWG then organized itself into four subgroups to examine in detail the elements and implementation of an advanced data processing and distribution system. The subgroups and their chairmen are:

Office of Base Standards	C. P. Sonett (Univ. of Arizona)
Networking and Communications Standardization	R. Gold (Applied Physics Lab., Johns Hopkins Univ.)
Hardware/Software Policy Management	J. Cerny (Utah State Univ.)
	R. Heiles (Univ. of Texas, Dallas)

Space science investigators interested in contributing to the deliberations of the DSUWG should contact the chairman of the subgroup closest to their interests or either of the cochairs of the working group.

The recommendations sent to NASA by the working group follow.

Recommendations

The DSUWG recognizes that corrective studies are now more than ever, impeded by the inability of different institutions to efficiently manage and transfer data from one location to another in a timely fashion. The large volume of data obtained in the 1970's by each investigator should have required early scientific involvement and data-based management, which, except for the AE project, was generally not undertaken. In an effort to prevent this problem in the future, the DSUWG therefore recommends that NASA

- establish end reflect, through its internal organization, an explicit policy that scientific data management is a major concern of the agency;

- dedicate the requisite resources for planning and sustaining the flow of data through all phases of the data chain, from conception of a mission to conclusion of the data analysis;

- authorize the involvement of scientific investigators in all stages of the data chain, including system design, implementation, and utilization, and section the flexibility to modify the system according to date processing requirements;

- support and direct the application of advanced technology to the creation of facilities for sharing the processing, transmission, storage, retrieval, and analysis of data in a commonly accessible and timely manner, both within and across mission and institutional boundaries.

The DSUWG also urges further study within the working group and NASA to explore and help define details of standardization, protocol, communication, and operations necessary in order to implement the recommendations at the earliest possible pace. Worldwide standards of computer interchange are being devised; NASA should ensure that these standards are followed when confirmed and that interim standards are compatible as far as possible.

Now, as you know, we have been working with the industry to look at the possibility of incorporating the Centaur stage into the Shuttle, an option that has been extensively studied and has frequently been proposed as an alternative to the three-stage IUS. I have concluded that within the 1981 and 1982 resources that the budget would provide we could begin modifications of the Centaur, provisions for integrating it with the Shuttle, and the relatively minor changes to launch facilities at the Cape (Kennedy Space Center, Fla.) so as to have this very powerful combination available for first launches in 1985. No other alternative upper stage is available on a reasonable schedule or with comparable cost. The Shuttle/Centaur would assist our planetary mission needs and would offer, both to commercial customers and to national security interests, a highly capable launch vehicle with growth potential.

Therefore, NASA will expand discussions with the Air Force on the best means for providing upper stages to meet the needs of the nation in the second half of this decade and work with them to continue with development of the two-stage IUS, which both we and the Air Force are counting on for a number of critical missions. We will also make preparations with the General Dynamics Corp. (St. Louis, Mo.) to enable us to enter into a contract this spring for integration of the Centaur vehicle in the Shuttle for the 1985 Galileo and ISPM (International Solar Polar Mission) launches.

Of course, significant changes of this magnitude in our plans will be subject to confirmation as the Administration changes. Pending review of NASA's recommendations by the new Administration and the Congress, NASA will work with the Air Force to permit orderly implementation of the Space Transportation System and our respective programs. —PMB

Einstein Observatory Resumes Operation

The orbiting Einstein Observatory has returned to full-time scientific operation after an onboard gyro that failed last August inexplicably came back to life, according to controllers at the Goddard Space Flight Center, Greenbelt, Md. First indications of maneuvering problems in the X-ray observing space telescope mission. The 13.1-m telescope is to be placed into a 600-km-high orbit by the space shuttle, and it will perform scientific investigations for at least 15 years.

The Association of Universities for Research in Astronomy (AURA), a consortium of 14 universities, has been selected for final negotiation of a contract to establish, operate, and maintain STS for the space telescope scheduled for launch in early 1985 on the space shuttle. The contractor's estimated cost for the initial 5-year contract is approximately \$24 million. Additional funding will be required in support of a guest observer and archival research program, as it develops. The contract will contain options for three additional 5-year extensions.

The institute will host American and foreign astrono-

mars, who will come to the facility to use the space tele-

scope much as they would use a ground-based observatory.

The telescope's science data will be sent via

tracking and data relay satellite and the NASA communica-

tions network to the Goddard Space Flight Center,

Greenbelt, Md., and then on to the institute for use by the

staff and guest scientists. Investigators will be able to

ask controllers at Goddard to point the spacecraft at any

desired field of view.

For reasons not yet fully understood, the inactive gyro

began to function normally on December 6, and the space-

craft was able to resume normal operations. The satellite, known officially as the High Energy Astronomy Observatory (HEAO-2), was launched November 13, 1978. It was nicknamed Einstein, by the astrophysicists involved in the mission, in honor of the scientist-mathematician Albert Einstein, and because of the proximity of its launch date to the 100th anniversary of Einstein's birth.

Designed for an operational life of 1 year, the observatory

has operated for more than 2 years and is expected to continue

for several months before its propellant supply is exhausted. In its more than 2 years of operation, the satellite has returned thousands of X-ray pictures, which will provide scientists a better understanding of X-ray activity in space and new clues to the origins of galaxies. —PMB

Geophysicists

Philip S. Juillet has joined the Nuclear Regulatory Commission as a staff geologist in the Geosciences Branch, Division of Engineering, Office of Nuclear Reactor Regulation, which is based in Bethesda, Maryland.

Della Laura has been appointed chief of the U.S. Geological Survey's Office of International Hydrology. She had been the assistant chief of that office since July 1979.

Barney P. Popkin joined Dames and Moore in Houston as senior hydrologist in January. He was formerly on the staff of the University of Arizona's Environmental Research Laboratory.

Frank Preiss, director of the Office of Science and Technology Policy under President Carter, has been selected as the 18th president of the National Academy of Sciences. His 8-year term begins July 1. Preiss was president of AGU 1974-76, is a fellow of AGU, and was the 1979 recipient of the William Bowie Medal. —PMB

Geophysical Events

This item comprises selected portions of *SEAN Bulletin*, 5(12), Dec. 31, 1980, a publication of the Smithsonian Institution.

Volcanic Activity

Mount St. Helens Volcano, Cascade Range, Southern Washington, USA (46°20'N, 122°18'W). All times are local (GMT - 8 h). Renewed dome growth took place at Mt. St. Helens in late December, without the large explosion that immediately preceded previous dome-building episodes in June, August, and October.

Activity was limited to minor seismicity and weak vapor emission for about a month after the October 16-18 explosions and dome extrusion. Frequent periods of very low level harmonic tremor, lasting a few minutes to several hours, began to appear on seismics records November 19. Bursils of higher-level tremor, similar to explosion events seen earlier at Mt. St. Helens, could often be correlated with injections of vapor columns that sometimes contained ash. A few discrete shallow earthquakes were recorded but remained infrequent until late December.

A series of vapor plumes marked the volcano's behavior throughout much of December. A few minutes of stronger tremor accompanied emission of a vapor plume that rose to 3-5 km altitude December 7 and one of several bursts of higher-amplitude tremor on December 9 occurred as a plume was ejected to 2.7 km altitude at 1325. A new thin deposit of ash was noted on the upper south flank early December 12. Emission of this ash was not observed, but a burst of intermediate tremor had begun at 0417, lasting about 30 min. On December 13 at 2017, a plume reached 5.5 km altitude as higher-level tremor was recorded. Inspection of the dome December 15 revealed a new small crater in its southern edge. Adjacent to the new crater, a roughly triangular section of the dome had been removed, extending about 15 m along the outer edge and 30 m toward the center of the dome. Plumes associated with increased tremor rose to 3.3 km altitude

(News cont. from page 51)

Sismicity was relatively weak in October and November except on 4 and 9 October when swarms of small 5-type earthquakes were recorded (see Figure 2). The Japan Meteorological Agency's seismometer was removed on 15 November because the volcano was quiet. People on the island reported no felt earthquakes, and decreasing steam activity through December. Life returned to normal for the island's 300 inhabitants soon after the 28 September eruption.

Information contact: Same as for Sekurazima.

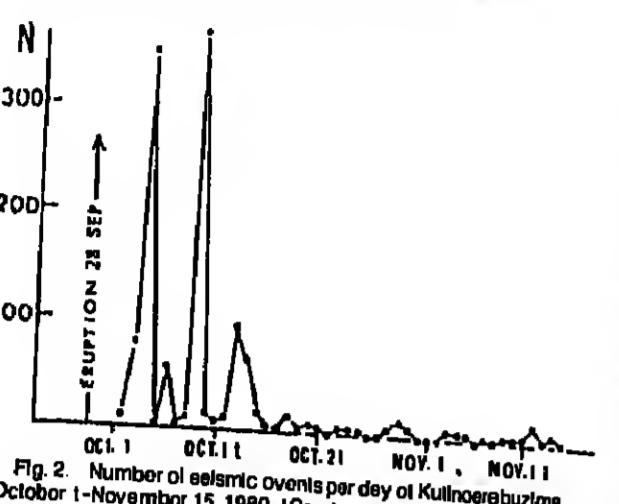


Fig. 2. Number of seismic events per day of Kuchinoerabuzume, October 1-November 15, 1980. [Courtesy of the Japan Meteorological Agency.]

Submarine Volcanoes, Volcano Islands area, North Pacific Ocean. The Japan Maritime Safety Agency (JMSA) continues frequent aerial monitoring of several known submarine volcanoes (see Table 1). Renewed activity at Miyoshino was first observed from a fishing boat on November 15. Observations at Fukutoku-oko-no-na, Minami-hiyoshi, and Fukujin April 24-October 2 are summarized in last month's *bulletin*. Nikko, last seen active in July 1979, was not observed by JMSA in November or December.

Information contact: Same as for Sekurazima.

TABLE 1. Volcanic Activity at Four Sites in the Volcano Islands Area, November-December 1980

Volcano	Nov. 14	Dec. 18	Dec. 23
Miyoshino (31.92°N, 139.92°E)	—	—	D
Fukutoku-oko-no-na (24.28°N, 141.52°E)	D	D	—
Minami-hiyoshi (23.50°N, 141.90°E)	N	N	—
Fukujin (21.93°N, 143.47°E)	N	N	—

D—dissolved water observed; N—no dissolved water visible; —no overnight.

Suwasezima Volcano, Ryukyu Islands, Japan (29.53°N, 129.72°E). Strombolian explosions have occurred almost every month since November 1980 from Otake, the highest point on Suwasezima Island. Eruptive activity has typically lasted from one to a few days. The only damage from the 1980 explosions was caused by minor ash falls on crops. Between explosive periods, white vapor rose a few hundred meters above the vent.

Information contact: Same as for Sakurazima.

TABLE 2. Eruptive Activity from Otake, December 18, 1979-December 13, 1980

Date	Cloud Height, km	Activity
1979		
Dec. 18	0.3	Three explosions
1980		
Feb. 5-6	1.5	About 10 explosions; Incandescent column
Mar. 21-22	1.0	Many explosions
Apr. 25-26	1.5	Explosions; ash fell on inhabited areas
May 13	0.5	Three explosions
May 18	0.5	Six explosions; persistent ash ejection
Jun. 4-5	0.5	More than 25 explosions
Jul. 16-19	0.5	Many explosions
Aug. 3-8	1.5	Several tens of explosions; Incandescent column
Aug. 21-23	1.0	More than 20 explosions; Incandescent column
Sep. 6-9	1.0	More than 1000 explosions
Sep. 20	1.0	Three explosions
Sep. 24-27	2.0	More than 1000 explosions
Oct. 25-27	0.5	Persistent ash ejection
Nov. 8-10	1.5	More than 1000 explosions
Nov. 29	1.5	Persistent ash ejection
Dec. 13	0.5	Explosions

Terumai Volcano, Hokkaido, Japan (42.68°N, 141.38°E). Seismic activity at Terumai increased in November after about 1½ years of quiescence (see Figure 3). The most recent eruptive activity, weak ash emission December 1978-May 1979, accompanied an increase in seismicity.

Information contact: Same as for Sekurazima.

Mayon Volcano, southeast Luzon Island, Philippines (13.26°N, 123.62°E). All three are local (GMT + 8 h). A moderate quantity of dirty white steam rose weekly to 200 m above the crater rim on December 4 at 1247, accompanied by short-duration harmonic tremor on the Mayon Resthouse Observatory seismograph. Faint crater glow was first noted at 2315 the same day. Additional steam emission was observed December 12 and 14.

Harmonic tremor was first recorded at Mayon on August 16. Episodes of tremor and discrete earthquakes continued through December. Similar seismic activity preceded the 1978 eruption and accompanied crater glow in July 1978.

Information contact: Olimpio Peria, Acting Commissioner, Commission on Volcanology, 5th Floor, Hizon Bldg., Quezon Blvd. Ext., Quezon City, Philippines.

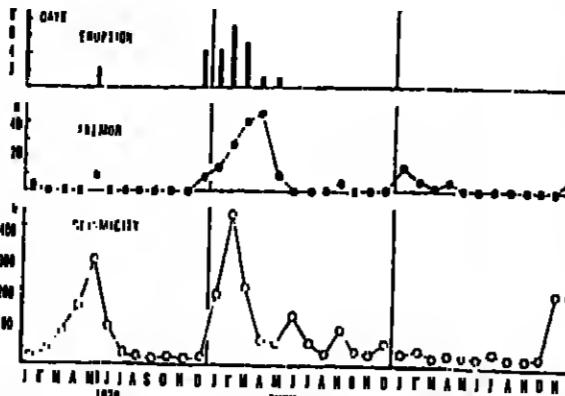


Fig. 3. Monthly numbers of days in which eruptions occurred (top), harmonic tremor events (center), and recorded earthquakes (bottom) at Terumai, January 1978-December 1980.

Volcanic Activity in Nicaragua, El Salvador, and Guatemala-Late 1980

Geologists from Dartmouth College, the Instituto Geográfico Nacional of Guatema, and the Instituto de Investigaciones Sísmicas of Nicaragua observed eight Nicaraguan, two Salvadorean, and two Guatemalan volcanoes between mid-November and early December. Dartmouth geologists provided the following report.

Nicaragua

Cerro Negro (12.52°N, 88.73°W). Summit crater fumarole remained at temperatures as high as 300°C. A small vapor plume was intermittently visible. Seismic activity had dropped from the high level of June.

Costa Rica (10.97°N, 87.58°W). No tumarolic activity was visible from the rim.

Lee Piles (El Hoyo) (12.48°N, 88.88°W). A small continuous vapor plume was still being emitted from the top of the kilometer-long crack in the summit.

Meseye (11.95°N, 86.15°W). Emission of a very large gas plume has continued without interruption since fall 1979. Remote sensing of SO₂ revealed continued high-level flux, with 1500-2000 tons/day average for the entire year. The hole through the surface of the lava lake was larger than in previous years, and a great deal of sublimation was occurring around its edge. No lava or red glow was visible during daylight. Acid gas and rain continued to cause considerable damage downtown.

Mombacho (11.83°N, 85.98°W). A small intermittent plume was visible, rising from the southeast section of the summit.

Momotombo (12.42°N, 88.55°W). The summit crater fumaroles continued to be very hot, with temperatures measured to 735°C and reported to >900°C. A small vapor plume continued, and remote sensing revealed very low rates of SO₂ emission. Portions of the crater were seen to glow red and orange when observed at night, with the highest temperatures on the steep south wall of the crater. No seismic activity has occurred recently at Momotombo.

San Cristóbal (12.70°N, 87.02°W). A moderate-sized vapor plume rose continuously from the summit. Remote sensing of SO₂ revealed increased flux since June 1980, but SO₂ emission remained far below the levels of the mid-1970's.

Siquijor Island, Philippines. A swarm of earthquakes began to be felt at Lez, on the south coast of Siquijor Island, on December 17. By December 19, recorded events averaged 102 per hour, and several may have reached magnitude 4-5. Loud detonations reportedly accompanied the seismicity.

The next day, 95 strong earthquakes were recorded, accompanied by more detonations, and about 5000 residents fled to nearby landfalls. Earthquakes continued, but in decreasing numbers, through the end of December.

Initial investigations by the Commission on Volcanology and others yielded epicenters about 1.7 km N35°E of Lez, with depth of focus averaging 2.8 km. Event locations trended NNW. The commission believes that the seismicity was probably caused by movement along a normal fault in the east central part of the island. Seismic monitoring was continuing in early January.

Information contact: John A. Wolfe, MCCPO, 8ox 1888, Makati, Metro Manila, Philippines.

Olimpio Peria, Acting Commissioner, Commission on Volcanology, 5th Floor, Hizon Bldg., Quezon Blvd. Ext., Quezon City, Philippines.

United Press International.

Earthquake Swarm

Siquijor Island, Philippines

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United Press International.

Fireballs

Western Australia, July 13, 1241 GMT (2041 Western Australia Standard Time). David Dane saw a magnitude 10 violet-blue fireball from Belmont (near Perth). The object first appeared near alpha Capricorni. It left a blue train that persisted for 48 s.

Information contact: Robert A. Mackenzie, 26, Adrian Street, Dover, Kent CT17 9AT England.

Western Australia, July 25, 1502 GMT (2302 Western Australia Standard Time). John Leonard and Mrs. J. Hughes and family observed a brilliant fireball from Wembley and Gosnall (near Perth). The meteor traveled from the constellation Scorpius to the western horizon, where it disappeared behind a cloud bank. It was much brighter than the gibbous moon present in the sky at the same time, and it lit up the landscape, tree tops, and cloud banks. A train persisted for about 3 s.

Information contact: Same as above.

Western Australia, August 3, 1555 GMT (2355 Western Australia Standard Time). Craig Willoughby of Belmont (near Perth) observed a fireball that first appeared as a very slow, reddish, magnitude +2 object in Delphinus (alpha Del, delta +14°). After traveling about 10° of arc, it suddenly brightened to a dazzling white and increased in diameter to about 1/3° of arc. The meteor then continued through Capricorn, slowly fading before ending near gamma Cris (alpha 32°, delta -32°). At its brightest the fireball reached a magnitude estimated by Mr. Willoughby, an experienced observer, at -15, lighting the sky as if at sunset. A train persisted for 35 s, noticeably distorted by upper atmosphere winds, before it disappeared.

Information contact: Same as above.

Pecaya (14.38°N, 90.80°W). A very small cinder cone had grown inside Mackenney Crater. In the last 2 months, a large gas plume rose continuously from the summit.

Santiguito (14.76°N, 91.55°W). Ash and gas eruptions from Caliente vent (at the eastern end of Santiguito Dome) occurred irregularly over the 3-day period of observation.

with intervals of 1/2 hour to 4 hours between eruptions. Most eruptions lasted 2-3 min and sent ash and gas columns to heights of several hundred meters to 1 km above the vent. Five millimeter of ash accumulated at the foot of the dome over one 12-hour period. Eruptions occasionally threw 10-m blocks several hundred meters and ejected tephra to well above the summit of Santa María. Although not directly observed, the plug dome and blocky lava flow that was seen being extruded from Caliente vent in February was apparently still very active. Large avalanches of glassy material could be heard from Caliente vent many times per hour. Debris from these avalanches was visible in the barranca below Santiguito.

Information contacts: Richard E. Stolper, Stanley N. Williams, H. Richard Neslund, Lawrence L. Meltzer, and Mark Conrad, Department of Earth Sciences, Dartmouth College, Hanover, New Hampshire 03755.

Samuel Bonal, Instituto Geográfico Nacional, Avenida las Américas, 5-78, Zone 13, Guatemala City, Guatemala.

Arturo Aburto and Douglas Fejardo, Instituto de Investigaciones Sísmicas, Apartado Postal 1761, Managua, Nicaragua.

Earthquakes

Date	Time, GMT	Magnitude	Latitude
Dec. 7	1737	5.7 M _s	36.02°S
Dec. 17	1622	6.7 M _s	49.41°W
Dec. 19	0117	6.1 M _s	34.54°W
Dec. 22	1251	5.5 M _s	34.39°W

Longitude	Depth of Focus	Region
1.23°E	10 km	northern Algeria
129.81°W	10 km	west of Vancouver Island, Canada
50.70°E	shallow	north central Iran
50.49°E	32 km	north central Iran

The Algeria event injured 20 persons in the El Asmer area, which was devastated by earthquake October 10 that killed thousands and left about 400,000 homeless. There were no reports of casualties or damage from the December 17 shock. The December 19 earthquake killed 28 persons. The nearby event 3 days later caused three deaths and 139 injuries, according to official reports.

Information contacts: National Earthquake Information Service, U.S. Geological Survey, Stop 987, Denver Federal Center, Box 25048, Denver, Colorado 80225 USA.

United Press International.

The Associated Press.

Earthquake Swarm

Siquijor Island, Philippines. A swarm of earthquakes began to be felt at Lez, on the south coast of Siquijor Island, on December 17. By December 19, recorded events averaged 102 per hour, and several may have reached magnitude 4-5. Loud detonations reportedly accompanied the seismicity.

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Astronomy and Astrophysics Abstracts, vol. 27, Literature 1980, Part 1, S. Böhme, U. Eiser, W. Frick, I. Heimrich, W. Hoffmann, O. Krah, O. Rose, D. Schmedel, G. Zeeh (Eds.), Springer, New York, x + 939 pp., 1980, \$69.70.

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Catalog of Tsunami Photographs—Key to Geophysical Records Documentation, No. 13, J. B. Nealon, National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo., vi + 52 pp., 1980.

The Coastal Almanac for 1980—The Year of the Coast, P. L. Ringold, J. Clark, W. H. Freeman, San Francisco, Calif., xvi + 172 pp., 1980, hardbound; \$19.95, paper: \$9.95.

A Concise World Atlas of Geology and Mineral Deposits, D. H. Derry, John Wiley, New York, 110 pp., 1980, \$61.95.

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The Continental Crust and Its Mineral Deposits, Spec. Pap. 20, D. W. Strengway (Ed.), Geological Association of Canada, Waterloo, Ontario, viii + 804 pp., 1980, \$30.00.

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Descriptive Regions/Oceanography, Pergamon Mer. Ser. vol. 3, P. Tchernie, Pergamon, New York, xvii + 253 pp., 1980.

Developments in Petroleum Geology—2, G. D. Hobson (Ed.), Applied Science Publishers, London, x + 345 pp., 1980, \$70.00.

A Dynamic Stratigraphy of the British Isles—A Study in Crustal Evolution, R. Anderson, P. H. Bridges, M. R. Lees, and B. W. Sellwood, George Allen & Unwin, Boston, Mass., x + 301 pp., 1979.

The Future of American Agriculture as a Strategic Resource, S. S. Belle and R. G. Healy (Eds.), The Conservation Foundation, Washington, D.C., xv + 294 pp., 1980.

General Oceanography—An Introduction, 2nd Ed., G. Diele, R. K. Kalle, W. Krause, G. Siedler, John Wiley, New York, xxi + 226 pp., 1980.

Geochemistry of the Lithosphere, A. A. Beus, MIR Publishers, Moscow, 366 pp., 1978, \$10.00.

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Hydrogeologist. An outstanding career opportunity with excellent potential for advancement is currently open for a top professional interested in applied research. Duties will include planning, designing and conducting broad-based groundwater resources investigations. Specialization in geochemistry including expertise derived from academic training or experience in hydrogeochemistry will be considered an asset. Demonstrated ability to plan and execute programs to study the evolution of geochemical processes in groundwater flow systems, including the movement of pollutants through granular or fractured media, is required. Good writing ability is a must. District facilities include drill rig, sophisticated geological logging equipment, chemistry laboratory and in-house computer and publishing facilities. Excellent fringe benefits package. Minimum entrance salary \$18,324 per annum depending on training and experience. Minimum qualifications include M.S. in hydrogeology or geochemistry or equivalent training and experience. Interested and qualified professionals are encouraged to apply to Personnel, South Florida Water Management District, P.O. Box 1100, West Palm Beach, FL 33402.

An equal opportunity/affirmative action employer.

Physical Oceanographer/Geophysical Fluid Dynamicist. Arete Associates, a growing research firm, located in Southern California, engaged in theoretical and empirical physical oceanography, is offering permanent full-time positions. Candidates require Ph.D. (or equivalent experience) in theoretical oceanography or geophysical fluid dynamics. Salaries are competitive and negotiable, based on qualifications. Arete offers a fringe benefit package of superior quality. Qualified candidates should send resume, salary history, and list of professional references to:

Personnel Administrator
Arete Associates
P.O. Box 360
Encino, CA 91316
An equal opportunity employer M/F

Postdoctoral Research Associate, Oceanography Department of the Naval Postgraduate School invites applications for a presently available tenure track position in geophysics. Rank and salary are open, depending on qualifications and experience. A Ph.D. is required. Applied or exploration geophysics orientation are preferable; however, other specializations in geophysics will also be considered.

Primary responsibilities will include generating

and conducting research programs as well as teaching graduate courses in geophysics. The department currently consists of 31 regular faculty members including 19 in the areas of geology and geophysics. Please send resume and names of three references to Prof. I. J. Win, Search Committee Chairman, Department of Marine, Earth and Atmospheric Sciences, NC27850, USA. We hope to make a final decision prior to May 31, 1981.

North Carolina State University is an equal opportunity/affirmative action employer.

Sediment Transport/Geological Oceanography. A tenure track position is available in the Department of Marine, Earth and Atmospheric Sciences. Duties include the application of remote sensing techniques to the investigation of natural resource phenomena. The candidate is expected to have a Ph.D. degree in porchor, watershed sciences or in a related field and is expected to develop and maintain a vigorous research program with special emphasis on the application of state-of-the-art remote sensing techniques to the investigation of natural resource phenomena. The candidate is expected to work together with a team of researchers to develop and implement a research program which will acquire data and developed insights over the course of several years.

Position is available January 1981 and is renewable annually. Salary depends upon qualifications. Send resume and the names and addresses of three references to Faculty Search Committee, Department of Marine, Earth and Atmospheric Sciences, NC27850, USA. We hope to make a final decision prior to May 31, 1981.

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North Carolina State University is an equal opportunity/affirmative action employer.

Equal opportunity/affirmative action employer.

Structural Geologist. The Geology Department at the University of Southwest Louisiana in Lafayette, Louisiana invites applications for an anticipated research position in structural geology. Responsibilities will include one-half time in seismic investigation of oil/gas and geothermal reservoirs of South Louisiana and one-half time teaching geophysics and supervising graduate students. The successful applicant will be familiar with exploration seismic data acquisition, processing, interpretation. The Ph.D. or Masters with experience is required. Salary range is \$32,000 to \$35,000 per annum.

The position is expandable to full time in the Spring of 1981 or as soon as possible thereafter.

To apply please submit a resume, three letters of recommendation, and any other pertinent material to Dr. Gary L. Kinsland, Geology Department, University of Southwest Louisiana, Lafayette, LA 70504.

The University is an equal opportunity/affirmative action employer.

Geophysicist. The Geology Department at the University of Southwest Louisiana in Lafayette, Louisiana invites applications for an anticipated research position in structural geology. Responsibilities will include one-half time in seismic investigation of oil/gas and geothermal reservoirs of South Louisiana and one-half time teaching geophysics and supervising graduate students. The successful applicant will be familiar with exploration seismic data acquisition, processing, interpretation. The Ph.D. or Masters with experience is required. Salary range is \$32,000 to \$35,000 per annum.

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The University is

AGU

Meteorology Section Considers New Name

The AGU Meteorology Section business meeting was held at the Jack Tru Hotel, December 9, during the AGU Fall Meeting in San Francisco. The principal item discussed at the half-hour meeting was the proposal made by several members that consideration be given to renaming the section "Atmospheric Sciences." The members present felt the proposed name would better serve the strong physical, chemical, and electrical constituencies now in the Meteorology Section. There was also some indication that those now in the SPR: Aeronomy Section would be interested in joining a revamped Atmospheric Science Section.

The consensus of the meeting was that this issue be pur-

sued further by the officers of the Meteorology Section with other appropriate officials of AGU. The possibility of forming a small committee to define this proposal more precisely was also favored by the attendees.

Those standing were Tommy Augustsson, Old Dominion University; Bill Boeck, Niagara University; Jack Fleeman, NASA/Langley; T. E. Graedel, Bell Laboratories; Joel S. Levine, NASA/Langley; Stan Ruitenberg, NCAR; Russ Schnell, NOAA/ARL; Rich Stolarski, NASA/Goddard; Ron Taylor, NSE; and Jay S. Winston, NDA/NWS.

Jay S. Winston, Secretary
Meteorology Section

Candidates for JGR-Blue Editor Sought

George L. Siscoe will complete his term as editor of the *Journal of Geophysical Research*—Blue at the end of 1981. A selection committee, chaired by Norman F. Ness, has been appointed to recommend candidates to the AGU president. Nominations for the editor for the space sciences section of JGR for the term 1982–1985 are now being accepted. Those who are interested in serving as editor, or who wish to suggest candidates, should send recommendations by April 15 directly to

American Geophysical Union
2000 Florida Avenue, N.W.
Washington, D.C. 20009
Attention: JGR Search Committee

Meetings

Indonesia Plans Krakatau Commemoration

To commemorate the 100th anniversary of the August 27, 1883 eruption of Mount Krakatau, the Indonesian Institute of Sciences (LIPI) is sponsoring a 2-year program of expeditions and research that will culminate in a symposium on or about August 27, 1983.

The scientific activities and the symposium will center on volcanology and geology, marine and terrestrial biology, oceanography, and social aspects related to the Mount Krakatau eruption which left 36,000 people dead.

Scientists and institutions wishing to participate in the program and the concluding seminar should submit their proposals directly to LIPI, Jl. Teuku Chik Diliro 43, Jakarta, Indonesia, et al.; Didin Sisirapradja, Deputy Chairman for Natural Sciences.

Volcanics in the Atmosphere

A session on the role of volcanic emissions in atmospheric chemistry will be held during the IAPM Third Scientific Assembly in Hamburg.

Contributed papers are wanted for the special session, slated for August 21 and 22. Topics desired include those concerning mechanisms of volcanic emissions, experimental data and fluxes of gaseous and particulate matter in the atmosphere, the fate of volcanic products in the atmosphere, and the possible effects on the physics and chemistry of the atmosphere and future climate changes.

Abstracts should be sent to S. Ruitenberg, Secretary General of IAPM, NCAR, P.O. Box 3000, Boulder, Colorado 80307; deadline is March 2. Copies of the abstracts should also be sent to co-convenors Gerard Lambert, at Centre des Faibles Radioactivites, Domaine du C.N.R.S., F 91190 Gif-sur-Yvette, France; and John W. Winchester, Department of Oceanography, Florida State University, Tallahassee, Florida 32306.

revised version of an abstract must be published, it will also be assessed a \$25.00 charge.

Authors will be notified by mail in late April of the status of their papers. Receipt of all papers will be acknowledged.

Ten minutes is normally allowed for the presentation of each contributed paper, and only 2' x 2' (35-mm) slide projectors and viewgraphs are usually available as standard equipment at the meeting. All other equipment is available at cost plus a \$10.00 billing charge if we have to invoice.

Instructions for Preparing Meeting Abstracts

The abstract page is divided into two parts: the abstract itself and the submittal information. Follow the instructions for both carefully. Please use a carbon ribbon to type the material, and do not exceed the maximum dimensions of the abstract of 10.4 cm by 20 cm. Abstracts that exceed the noted size limitations will be trimmed to conform to the proper dimensions.

The meeting program will be prepared by photographing the abstracts exactly as they are received. Use the model abstract to prepare the final version. Submission of an abstract for an AGU meeting is presumed to carry with it permission for AGU to reproduce the abstract in all editions of *Eos* and in the programs and reports relating to the meeting; it is also presumed to permit the free copying of those papers. Although *Eos* is a copyrighted journal, authors are not requested to transfer copyright; copyright, where it exists, will be reserved by the authors.

Sample Abstract	
TECHNIQUE FOR PREPARATION OF ABSTRACTS	
F. R. S. T. Author (School of Geosciences, Hydro University, Worcester, Mass. 01612) H. C. M. D. Author (USGS, Woods Hole, Mass. 02543) (Spanner) T. C. Alvin	
Follow this example in typing the abstract. The printing plates will be prepared by photostatic process. Type exactly as you receive them. Do not exceed the maximum length (20 cm) width (10.4 cm) limit set out in caption. Use a carbon ribbon with a good lead-off. A carbon ribbon will give best results. Please use <i>bold</i> for about 10% of the text. There will be a "signature" of about 10% of the text. Follow these guidelines: (1) Type title in all capital letters. (2) Leave one blank line after title. (3) Type author's name, affiliation, and address. (4) Type names of second and following authors, leaving one blank line between authors. (5) Indicate the name of author who will present paper. (6) Type sponsor's name if no author is an organization. (7) Leave one blank after author block. (8) Head-line symbols or Greek letters are permissible. (9) Use SI units.	
<small>NOTES: There are special forms distributed for typing abstracts; if necessary this block (10.4 x 20 cm) can be copied onto a sheet of paper in nonerasable blue pencil and may be traced in dark lines on a backing sheet. Be sure, however, to include all information. (10.4 cm)</small>	
(20 cm)	
<small>Abstract Due 4 Weeks Mail original and two copies to Program Manager, AGU, 2000 Florida Avenue, N.W., Washington, D.C. 20009</small>	
C (Contributed)	

Submittal Information

Numbers refer to the items in the submittal block on the sample abstract.

- Title of meeting.
- Identification. (Only members may submit an abstract; this includes invited authors.)—Type identification number of one member author (ID number) before consisting of 4 letters followed by 8 digits; use member's mailing label on *Eos* or journal) or if no author is an AGU member, type the ID number of the member sponsor. (Sponsor's name must also appear on the abstract at the end of the author portion.) If no ID number is given, a membership application and dues payment must accompany the abstract. Call AGU Member Programs (202-482-6903) immediately if you need an application.
- Corresponding address.—Give complete address and phone number to whom all correspondence (acknowledgment and acceptance letters) should be sent. Abbreviate as much as possible.
- Section of AGU to which abstract is submitted.—Use letter abbreviations of one of the following: G (Geodesy), GP (Geomagnetism and Paleomagnetism), H (Hydrology), M (Meteorology), O (Oceanography), P (Planetary), S (Seismology), SA (Aeronomy), SS (Magnetospheric Physics), SC (Cosmic Rays), SS (Solar and Interplanetary Physics), T (Tectonophysics), VGP (Volcanology, Geochemistry, and Petrology), U (Union).

- Type title of special session (if any) to which submittal is made.

- Indicate your preference for a particular kind of presentation by one of the following letters: O for oral, P for poster. The chairman may assign your paper to either of these types of presentation in order to fit his program plan.
- Percent of material previously presented or published, and where.
- Billing information
 - Complete billing address if other than the corresponding address (item 3 above).
 - If purchase order is to be issued, indicate number. (Please have issuing department list name of first author and title of paper on PO.)
 - If student member is the first author, the student publication rate is applicable. Indicate student rate applicable.
 - Indicates whether paper is C (contributed) or I (invited). If invited, list name of inviter.

General Regulations

Abstracts may be rejected without consideration of their content if they have not been received by the deadlines or if they contain material outside the scope of AGU activities or because they contain material already published or presented elsewhere. ONLY ONE CONTRIBUTED PAPER BY THE SAME FIRST AUTHOR WILL BE CONSIDERED for presentation; additional papers (unless invited) will be automatically rejected.

Only AGU members may submit an abstract. The abstract of a nonmember must be accompanied by a membership application form (with payment), or it must be sponsored by an AGU member.

A publication charge of \$40.00 for each contributed abstract will be invoiced (\$20.00 if the first author is a student member and if the appropriate notation is made on the abstract when submitted.) Both invited and contributed papers are subject to the publication charge unless specifically waived in writing. To repeat, the abstract must be received at AGU by March 4 to avoid an additional \$26.00 charge. If a

Program Committee

Meeting Chairmen:
Martin Wait, Lockheed Missiles and Space Company

Geodesy:
Clyde C. Goed, NOAA

Geomagnetism and Paleomagnetism:
John F. Hermance, Brown University

Hydrology:

John R. Ritter, USGS

Meteorology:

Ronald C. Taylor, National Science Foundation

Oceanography:

Gabriel T. Caenady, Woods Hole Oceanographic Institution

Planetary:

Mark Settle, NASA Headquarters

Seismology:

Thomas J. Fitch, MIT Lincoln Laboratory

SPR-Aeronomy:

Thomas A. Polhemus, The Johns Hopkins University

SPR-Cosmic Rays & SPR-Solar and Interplanetary Physics:

Lennard Fleak, University of New Hampshire

SPR-Magnetospheric Physics:

Michael Schulz, Aerospace Corporation

Tectonophysics:

Mary Lou Zoback, USGS

Volcanology, Geochemistry, and Petrology:

G. Brent Dalrymple, USGS

Special Sessions:

Geodesy:

Realization of a Conventional Terrestrial Reference System

Geomagnetism and Paleomagnetism:

MAGSAT

Electromagnetic Induction Studies and Mantle Conductivity:

Geophysical Institute, University of Alaska

Geomagnetic Field Intensity Fluctuations During the Last 10,000 Years and Their Effects on Radiocarbon Production in the Atmosphere:

James W. Head, Department of Geological Sciences, Brown University, Providence, RI 02912

Tectonophysics:

Tectonics of Venus and Earth: A Comparison (co-sponsor: Planetary and Geodesy)

Geological Processes on Icy Planetary Bodies (co-sponsor: Tectonophysics):

This special session will discuss the geological processes on icy bodies such as Europa, Ganymede, and Callisto. The submission of abstracts on geological characteristics and physical processes of surface and interior evolution is invited. For more specific information, contact E. M. Pernier, Department of Geological Sciences, Brown University, Providence, RI 02912.

Geodynamics:

Geodynamics of the Earth: A Comparison (co-sponsor: Planetary and Geodesy)

Large-Scale Thin-Skin Tectonics (co-sponsor: Seismology):

The following subjects are expected to be addressed in this session: large-scale detachments; sedimentary/extensional wedges (including some that may contain large allochthonous crystalline sheets); reactivation of old structures; Appalachian-type margins; Paleogeography; and evidence for microcontinents and exotic blocks, and modes of their emplacement; continental growth by accretion, and

implications for resource potential in overthrust belts. Some of the questions we wish to address in this session are: (1) Where and how widespread are large-scale detachments? (2) How do they affect the tectonics at plate boundaries and intraplate regions? (3) How are detachment structures formed? Can they persist as weakness zones through long geological times? What are tectonic conditions for their reactivation? (4) What are the mechanisms of detachment slip, i.e., the rheologic and physical processes associated with active detachment structures? For additional information, contact Leonardo Sesler, Lamont-Doherty Geological Observatory, Palisades, NY 10564.

Illinois Deep Hole Project: Continuous core from three privately drilled deep holes in northern Illinois and adjacent to one of these holes (1.6 km deep) were made available for scientific investigations through a steering group established in February 1980 by the U.S. Geodynamics Committee. The principal emphasis in the study of these deep holes, which penetrated about 1 km of Precambrian granite, was an integrated investigation of surface and in-hole experiments, as well as detailed petrologic and physical properties studies of the core samples. This special session will report on the results of some of these studies.

The in-hole experiments included in situ stress (hydrofracture) and permeability measurements as well as a complete suite of geophysical logs carried out to correlate with core studies. Core analysis includes investigation of the mineralogy, petrology, chemistry, ages, isotopic geochemistry, and geophysical properties of the rock. Surface geophysical investigations were conducted to delimit the extent of the pluton that was drilled into by the holes. (Organized by Bezalel Helmson, University of Wisconsin, Madison.)

Volcanology, Geochemistry, Petrology

Precambrian Evolution of the Earth (co-sponsor: Planetary and Tectonophysics): The purpose of the sessions is to bring together researchers in fields that bear on the development of the earth as a physical and chemical system and to integrate the ideas and data on terrestrial evolution from both the comparative planetary and earth-oriented approaches. The subject matter will include accretion and initial chemical segregation, thermal development, and magmatic evolution, and tectonics of the atmosphere. Some papers will be invited but contributed papers are most welcome. For further information, contact the session organizer: Frank Elstner, Department of Geophysical Sciences, University of Chicago, Chicago, IL 60637 (312/733-8118), and Kevin Burke, Department of Geological Sciences, State University of New York, Albany, NY 12222 (518/457-3974).

Silicate Melt Structure and Crystallization Kinetics: This session will bring together researchers in the fields of silicate melt structure and melt crystallization kinetics to review recent development in these fields and to present new data. The topics to be discussed include investigation of melt structure by Raman and X-ray spectroscopy and the investigation of the processes of nucleation and growth in both experimental and natural systems. Some papers will be invited, contributed papers are most welcome. For additional information, contact the session organizer, R. James Kirkpatrick, Department of Geology, University of Illinois, Urbana, IL 61801 (217/333-7414).

Geodesy/Meteorology/Oceanography

Description of SEASAT Sessions: The SEASAT sessions will emphasize scientific investigations that utilize data from the SEASAT satellite in the disciplines of oceanography, meteorology, geodesy and glaciology. Reports on novel algorithm development work that demonstrates significant improvements in geophysical extraction also are welcome.

Notice to SPR Section From President Norman Nees

We will carefully adhere to the standing rule of the AGU that an author may submit only one contributed paper at each meeting. The spirit of this rule is also meant to preclude groups of authors permuting their names on several papers to be presented in series so as to obtain more time. The program chairpersons of SPR will reject abstracts, or combine them if appropriate, in order to eliminate abuses of this rule.

Please note price change for SPR section luncheon: Cost per ticket, \$3.50 (due to subsidy). See *Eos*, vol. 62, January 27, p. 39, for registration forms.

Travel Grants to IAGA and IAMAP Scientific Assemblies

Deadline for Applications: April 1

AGU has applied to the National Science Foundation for grants to assist the travel of individual U.S. scientists to the Fourth Scientific Assembly of the International Association of Geomagnetism and Aeronomy, to be held in Edinburgh, Scotland, August 3–15, 1981, and the Third Scientific Assembly of the International Association of Meteorology and Atmospheric Physics, to be held in Hamburg, Germany, August 17–28, 1981. Application forms for the grants are available from

Member Programs Division
American Geophysical Union
2000 Florida Avenue, N.W.
Washington, D.C. 20009
(Telephone: 202/462-6903)

AGU Spring Meeting Flight Assistance to Baltimore

AGU will extend its arrangements with United Airlines to assist those attending the Spring Meeting in making their travel plans as economical and convenient as possible. The travel advisors at United are instructed to assist meeting attendees in making reservations and in gauging the best possible airfare.

The method of payment and piece of purchase of tickets is at the purchaser's option—by mail or by pickup at airline office, travel agency, or corporate travel office.

For personnel assistance with the most up-to-date information on seat availability and possible special rates, call this listed toll-free number: 800/323-0639 (in Illinois, call 312/589-3375). Limited discount seals may be available.

Chapman Conference on Spatial Variability in Hydrologic Modeling

July 21–23, 1981
Colorado State University, Fort Collins

Purpose: The conference will provide a forum where surface and groundwater hydrologists, soil scientists, and applied statisticians can discuss progress and research approaches to dealing with spatial variability of catchment surfaces and subsurface properties in a

